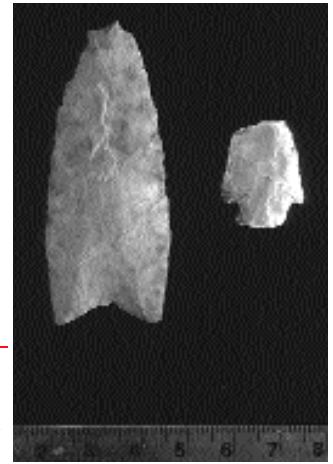


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Archaeology—A Crucial Role in Ecosystem Management



*Clovis point and
Pelican Lake point
from 8,000 ft alti-
tude in Banff
National Park*

Parks Canada is wrestling with fundamental issues regarding management of National Parks ecosystems. We wish to discuss here four topics central to the ongoing debates, focussing on the role that archaeological research can play. The principal topics are:

- Natural regulation versus human manipulation of the environment;
- Factoring past human interactions with the environment in contemporary management practices;
- Understanding historical variability in the ecosystem; and
- Employing historical and archaeological research in a multi-disciplinary context to contribute to ecological integrity.

Background

Ecological management of National Parks can take two extremes: allowing “nature to take its course” with no active human management, or intervening constantly and deliberately to maintain a “slice in time.” Within our National Parks system, we have examples approaching each of these extremes. In between them is a tremendous range of practices and philosophies; these derive from real management needs as well as political realities.

Mountain District ecosystem managers have proposed significant interventions to manage wildlife and vegetation. Employing background literature studies and computer generated models, key actions are being advanced as most feasible and of least public risk, for elk population reduction, carnivore enhancement, and vegetation renewal. Cultural information contributions to these studies and models require adequate consideration of the roles of Aboriginal peoples, of the limitations of the archaeological record, and keen awareness of the nature of paleo environmental knowledge.

There is for example, excellent anthropological evidence for Aboriginal burning in mountain environments of Alberta and British Columbia. This evidence is not voluminous but it is fairly extensive, ranging from the southern West Slopes

of the Rockies to the northern East Slopes. The literature points to Aboriginal burning of many different kinds—fires to encourage certain fruiting bushes, to encourage ungulate forage, to drive animals for hunts, or accidental fire from camps. Any or all of these would account for the “mosaic” observed in times past, but direct evidence of Aboriginal fires is lacking. Vegetation managers are making great use of proxy data—changes in fire regimes as indicated by tree ring studies, macro-charcoal in pollen cores, and so forth. To date, however, very little or no direct consultation with local Aboriginal people has taken place about past burning practices. In addition, the 13,000 year-old pollen record is remarkably coarse and finer resolution is required to illuminate patterns or events at the 10 to 100 year level.

The faunal management hypothesis held by Kay, that Aboriginal people “overkilled” elk in the mountains and were responsible for the low ungulate population levels apparently witnessed by early explorers of the west, is a highly debatable one. It does appear the elk levels were low, but why did they not recover following the drastic decline of Aboriginal populations in the early historic period? Why does the archaeological record not show an “overkill horizon”? If Native people were killing elk in this manner, where are the bones? Did early European hunting, or the introduction of horses, significantly modify the environments employed by elk? The conclusions that have been reached to date are but one possible answer.

The question remains: what roles did Aboriginal peoples and early Europeans play in shaping the mountain ecosystem? Certainly, both groups were an integral part of it. But whether they had long-lasting, but small-scale effects, large-scale and long-term effects, or temporary, local effects, are all questions we only have opinions on at the present time.

Discussion

A key issue in Parks management is the mediation of human recreational use and impact with biodiversity and ecological integrity. With the



Elk management is a highly debated topic in the mountain parks.

growth of public utilization of Park resources the importance of addressing the inter-relationships of cultural and ecological systems will only increase. Archaeology and history are in a good position to situate human cul-

tural systems within a more expansive environmental understanding. With such an understanding it is possible to make more informed management decisions with regard to public impacts within a National Park environment.

The priority of maintaining ecosystem integrity as outlined in the 1988 amendments to the *National Parks Act* necessitates a firm reckoning of the constitution of ecosystems. This has proven somewhat problematic in that it has been difficult to isolate the criteria for optimal conditions comprising an ecosystem. The environmental, climatological, vegetational and faunal elements all fluctuate throughout time within and across ecoregions. Further, it is becoming increasingly apparent that much of what is deemed natural landscape has been at least partially determined by past human activities. Hence the designation of any landscape as "virgin" and "natural" is both arbitrary and erroneous. Throughout time any one region has experienced many different configurations of ecological variables.

Ecosystem management becomes critical when any one species becomes too successful in its simplification of the landscape, especially to the detriment of other species. One position is that only because of biological diversity between and within species can an ecosystem adapt to environmental changes. With greater biodiversity comes an overall increase in adaptive potential and thus a larger range of environmental conditions can be endured. If one particular organism is unable to deal with change another species can fulfill its niche. Without diversity, in a simplified habitat characterized by the specialization of a few species, the failure of one species to adapt to fluctuating environmental conditions could bring about complete systemic collapse. Hence, as a management scheme, it is in the best interest to ensure that diversity is maintained and no one species is able to dominate the landscape.

This is the goal at present with regard to the contemporary human component in the mountain Parks. There is great concern about the sustainability of many forms of human impact upon nat-

ural habitats in the mountain Parks. Yet human participation in these ecosystems is probably well-engrained. It is apparent, for instance, that without episodic burns in montane and sub-alpine meadows intense colonization by one species often upsets the ecological balance. Aboriginal burning probably helped sustain the "patchwork mosaic" of vegetation in the montane regions. In this way, though the human role in ecosystem dynamics is understudied and not widely recognized, it is nonetheless central to ecosystem integrity. It must not be overlooked that the present ecological status of the National Parks has been influenced by at least four levels of human participation: prehistoric-aboriginal, historic fur trade and industry, tourism and recreation, and the impact of Parks Canada.

Ecosystem baselines are not "flat"—they fluctuate dynamically rather than being static. Archaeological and palynological information contribute a long-term perspective to these fluctuations, but are at the same time coarser than the contemporary environmental data. Establishment and use of baseline criteria for ecological integrity require very firm and defensible information on the relative stability, agents of change, and natural variability in the mountain ecosystem. Proper evaluation of the existing evidence requires team approaches by qualified professionals with full awareness of inherent biases in existing data and professional standards. The Kay studies were indeed extensive, but problematic as to elements of archaeological taphonomy and severe bias in consulting archaeology data. In addition, paleovegetation reconstruction based on pollen analyses have primarily looked at gross-scale time intervals associated with climatic change and have not focussed on detailed examination of the more recent (ca. 2000 year) past that would include both fine-scale climatic change and disturbance ecology.

Traditional environmental knowledge (TEK) of First Nations peoples with respect to the Canadian Rocky Mountains is thought to be considerable, although very little has been systematically gathered. TEK is only occasionally regarded as a potential management tool in the Mountain District, but is an accepted and useful component of land management in the Northwest Territories and Yukon. A study being completed at Waterton Lakes is the only comprehensive one ever undertaken in the Mountain District. The Waterton-Glacier Ethnoarchaeological Project by B.O.K. Reeves has resulted in a much improved picture of Blackfoot plant uses and interests there. Kootenay National Park's environmental history study proposes consultations with Elders concerning ungulate history in particular. The Stoney, Sarsi, Métis,

Beaver, Slave, and Cree people of western and northern Alberta also have very significant contributions to make to our knowledge of ecosystem processes in the mountain parks.

The contemporary anthropological and archaeological literature addresses many processes and concepts that have been developed to model and conceptualize ecosystems. Such concepts have often been extended to human population dynamics, including those of prehistoric, hunter-gatherer past. Some of the basic biological concepts to consider are:

- Keystone species;
- Predator/prey relationships;
- Prey switching;
- Edge effect;
- Optimal carrying capacity;
- Optimal foraging strategies;
- Effects of fire;
- Species diversity.

Some concepts applied specifically to human population dynamics include:

- Human subsistence strategies;
- Human adaptation;
- Environmental manipulation by use of fire and other techniques;
- Hunting strategies;
- Optimal foraging theory applied to hunter-gatherers;
- Aboriginal overkill;
- Post-Columbus epidemics and population decline;
- Post-Pleistocene extinctions. We need to consider all of these in a systematic and scientific manner.

What to do?

A thorough multi-disciplinary study is required by the body of scientific and historical disciplines that relate to population dynamics, biology, ecology, anthropology, and archaeology, to identify alternative models of human-environment dynamics within the larger Rocky Mountain ecosystem. A professional workshop has been held recently to frame the key management issues

within an understandable perspective and to begin testing models with regards to a longer term perspective.

This workshop sought to reach agreement on what is "natural variation" and how this was represented in the past. It helped to delin-

eat the bounds of our knowledge, to provide focus for work in areas where information is lacking. What we do about the variation we can agree upon, or how we respond to it, should be the subject of future discussion. Our objective is to have people who come at the issue from a historical perspective and an ecological perspective agree on the concept and research goals.

The Mountain District needs to develop a long-term multi-disciplinary research strategy, which will address the role of humans in the mountain ecosystem over time. This would involve

- working with other ecosystem researchers, historians and park managers to identify the research questions of most pressing common interest, and to identify our knowledge gaps;
- reviewing known archaeological site information to identify key sites with the potential to address such questions;
- carrying out site survey to identify new sites for time periods or environments of interest where there are no known sites;
- carrying out multidisciplinary excavations at selected sites;
- analysis of results focussing on changes or lack of changes in human-ecosystem interactions through time; and
- integration of results with other ecosystem specialist studies, and integration of results into natural and cultural resource management practices.

Just as ecologists have tended to view humans as "stressors" on ecosystems, archaeologists have been guilty of viewing ecosystems as "conditioners" of human adaptation. It's time we came together.

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Wickiup, of unknown function, Jasper National Park.

